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Protein Supplements and Performance of Cows and Calves in June-Calving Production Systems

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June-born calves grazed through the winter on cows fed protein supplement. Winter gain and summer protein supplement affected gain of yearling steers on summer grass and in the feedlot.

Summary

Lactating, June-calving cows that received protein supplement January through March maintained a lower body condition than dry June cows. Dry, non-supplemented cows lost more body condition compared to dry, supplemented cows over that same time period. June-born steers wintered at a low rate of gain (.4 lb/day) had higher daily gains on sub-irrigated meadow during May than June born steers wintered at a higher rate of gain (1.6 lb/day). Supplemental protein fed during summer grazing on range increased daily gains for steers wintered at both high and low gains compared to non-supplemented steers.

Introduction

A primary factor in determining economic efficiency in the beef cattle industry is feed cost. A June calving system was developed at the University of Nebraska Gudmundsen Sandhills Laboratory (GSL) to match the nutrient requirements of the cow to the nutrients available in the forage and to reduce the amount of harvested or purchased feeds that are typically fed in February-March calving systems. The need for protein supplement for grazing winter range after weaning in January has not been determined in the June calving system. Although nutrient content of the forage is low, nutrient requirements of a dry cow in the middle third of pregnancy also are low; therefore, supplemental protein may not be needed. When yearlings are integrated into the June-calving system, harvested and/or purchased feed and labor associated with feeding the calf after weaning from January to grass in May might be decreased by extending the grazing season of the calf through the winter. Grazing by the calf through the winter may be possible by leaving the calf with the cow from January to April, provided the cow is fed supplemental protein. The effect of rate of winter gain on summer gains of yearlings from June-calving systems and the effect of supplemental protein on summer daily gain of yearling steers from a June-calving system have not been determined. Our objectives were to evaluate: 1) the efficacy of extending grazing of June-calving cows and calves through winter, 2) effects of supplemental protein on dry June-calving cows grazing winter range, and 3) response of June-born yearling steers grazing summer range to supplemental protein.

Procedure

Winter grazing for dry and lactating June calving cows

Year 1. June-calving cows (95 head) were allotted equally to three winter grazing treatments: 1) Lactating cows with protein supplement (Lact-S), 2) Dry cows with protein supplement (Dry-S), and 3) Dry cows without protein supplement (Dry-NS). The winter grazing study began Jan. 6, 1999 and ended March 30, 1999. On Jan. 6, 1999, calves from cows in treatments 2 and 3 were weaned. All heifer calves and one-half of all steer calves were weaned on Jan. 6. Steer calves not weaned on Jan. 6 and their dams were assigned to treatment 1. Supplements were individually fed three times weekly to cows in treatments 1 and 2. Supplements were formulated to meet degradable intake protein (DIP) and undegradable intake protein (UIP) requirements of dry and lactating cows. Calves in treatment 1 were weaned on March 31. Body weight, body condition score (BCS), and pregnancy were recorded on all cows. (Table 2).

Year 2. The winter grazing study was conducted from Jan. 6, 2000 through March 29, 2000 during the second year. June calving cows (n=118) were split among the three treatments and all procedures were the same as in year 1.

June-born yearling steers

Year 1. June-born steers (n=62) were allotted to two rates of gain during winter and two protein treatments during summer grazing in a 2 x 2 factorial arrangement on Jan. 6, 1999. Rates of gain during winter were: 1) high gain and 2) low gain. Protein treatments during summer grazing on range were: 1) supplemental protein and 2) no supplemental protein. June born steers on high gain were weaned Jan. 6, 1999 and were fed wheat middlings at 2.8 lb/head/day and grass hay at 11.2 lb/head/day to gain 1.6 lb/day during winter. Low gain steers nursed the cows on range Jan. 6 to March 30, 1999 (treatment 1 of the cow study) and gained .4 lb/day. Steers wintered at high and low gain grazed subirrigated meadow from April 30 to May 31 and upland Sandhills range from June 1 to Sept. 9. One-half of the steers on both low and high winter gain treatments were fed protein supplement on range from June 7 to Sept. 8, 1999.

Table 1. Composition of protein supplement fed to June-born steers grazing upland Sandhills range.

Ingredient	% of supplement
Treated Soybean Meal	76.5
Feather Meal	18.8
Molasses	3.7
Pellet Binder	1.0

Steers on the supplement treatment were individually fed 2.9 lb of supplemental protein (Table 1) three times weekly. Body weight was recorded at the beginning and/or end of each grazing period through the winter and summer and average daily gain was calculated. Steers were finished at the University of Nebraska feedlot at Mead, Neb. Feedlot and carcass data are not presented in this paper.

Results

Winter grazing of dry and lactating June calving cows

Because there were no treatment by year interactions ($P > .10$), year effects were pooled across treatments. Cow body weight did not differ between the Lact-S and Dry-S cows nor the Dry-S and Dry-NS cows. Protein supplement appears to be important for dry cows to maintain condition while grazing dormant winter range, as shown by the lower ($P < .01$) BCS of Dry-NS cows (4.4) compared to Dry-S cows (4.7) on March 30. Lactating cows receiving protein supplement had lower BCS at the end of winter grazing on March 30 than dry cows receiving protein supplement (Table 2; $P < .01$). Body weight (1226 lb) and BCS (5.4) were similar ($P > .10$) across all treatments at precalving in June and prebreeding in September for year 1. It is interesting to note that although

(Continued on next page)

Table 2. Least squares means for cow body weight and body condition score for lactating cows receiving protein supplement (Lact-S), dry, supplemented cows (Dry-S), and dry, non-supplemented cows (Dry-NS) grazing winter range in 1999 and 2000.[a]

Item	Lact-S	Dry-S	Dry-NS	Contrast
Body Weight, lb				
Jan. 6, On Trial	1118	1101	1127	ns[b]
Mar. 30, Off Trial	1074	1073	1047	ns
Body Condition Score				
Jan. 6, On Trial	5.0	4.9	5.0	ns
Mar. 30, Off Trial	4.2	4.7	4.4	Lact-S vs. Dry-S** Dry-S vs. Dry-NS**

[a]All treatment x year interactions were non-significant (P>.10).
[b]ns = Non-significant P > .10.
** Significant P < .01

variation in BCS occurred between the three treatments on March 30, BCS for all treatments was similar at precalving and prebreeding. Percentages of cows pregnant for year 1 on January 6, 2000 were 96.2% for Lact-S cows; 89.7% for Dry-S cows; and 88.0% for Dry-NS cows. Pregnancy data are considered insufficient to draw conclusions until pregnancy data are available for year 2.

Yearling steers

No rate of winter gain by protein supplement interactions occurred (P >.10). Steers wintered at high gain were 57 lb heavier (P < .01) and 24 lb heavier (P < .10) than steers wintered at low gain on March 30 and on September 14, respectively. June-born steers wintered at a low rate of gain had daily gains .7 lb greater (P < .01) than steers wintered at high gain while grazing sub-irrigated meadow in May (Table 3). Protein supplement increased daily gain of steers by .4 lb/day compared to non-supplemented steers while grazing summer range.

Wintering June-calving cows with their calves on range January through March may be a practical method to overwinter calves in yearling systems if cows are fed protein supplement. Daily gain during winter and protein supplement during summer grazing affect daily gains and body weights at the end of summer grazing.

Table 3. Body weight and average daily gain (ADG) of June-born steers wintered at low (.4 lb/day) and high (1.6 lb/day) rates of winter gain, grazing sub-irrigated meadow without protein supplement (supp.) or range with or without protein supplement during 1999.[a]

	Winter gain			Protein supplement		
Item	Low[b]	High	P[c]	No supp.	Supp.	P[d]
Body weight, lb						
Apr. 30, On meadow	479	536	**	498	517	ns
May 28, On range	544	580	**	552	572	ns
Sep.14, Off grass	705	729	+	686	748	**
ADG, lb						
Apr. 30 - May 28, Meadow	2.3	1.6	**	1.9	2.0	ns
May 29 - Sep. 14, Range	1.5	1.4	**	1.2	1.6	**
Apr. 30 - Sep. 14, Combined	1.7	1.4	**	1.4	1.7	**

[a]Interactions between rate of winter gain and supplement were non-significant (P>.05).
[b]Calves in this treatment were nursing cows in treatment 1 of cow study.
[c]Low vs. high, ** = P < .01, + = P < .10.
[d]No supp. vs. Supp., ns = non-significant, ** = P < .01.

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